CLAIMS

1. A modified cycloolefin copolymer obtained by chemical modification of a base polymer being a cycloolefin copolymer with an ethylene chain, through addition of a modifier compound having a functional group and a hydrogen-donating group or having a functional group and an alkyl halide group, wherein:

the functional group is added at a stoichiometric percentage of 20 to 90% of all the replaceable hydrogen atoms in ethylene chains and main-chain cycloolefin chains of the base polymer; and

the distribution degree of the functional group-modified cycloolefin copolymer in the base polymer is in the range of 0.01 to 0.1 as expressed in distribution correlation coefficient (DR) defined by the relation (1) below:

$$(DR) = [(RI) - (UV)]^2 \cdots (1)$$

wherein (RI) and (UV) are dispersion indexes of molecular weight distributions (= weight-average molecular weight/number-average molecular weight) determined by simultaneous detection based on change of refractive index (RI) and detection based on a UV absorption spectrum characteristic of the functional groups added.

2. The modified cycloolefin copolymer according to claim 1, wherein the functional group is at least one group selected from the group consisting of carboxyl group, hydroxyl group, amino groups, amide groups, imide groups, alkoxysilyl groups, isocyanate groups, epoxy groups, hydroxyalkyl groups and alkoxyalkyl groups.

3. The modified cycloolefin copolymer according to claim 2, wherein the functional group is a carboxyl group and the amount of the carboxyl group added in terms of acid value is in the range of 20 to 200 mgKOH/g.

4. A process for producing modified cycloolefin copolymers by chemically modifying a base polymer being a cycloolefin copolymer with an ethylene chain through uniform addition of a modifier compound having a functional group and a hydrogen-donating group or having a functional group and an alkyl halide group, the process comprising:

adding 1 to 30 parts by weight of the modifier compound and 20 to 300 parts by weight of an organic solvent to 100 parts by weight of the base polymer in an inactive atmosphere with stirring to give a solution;

while heating the solution at 70 to 95°C with stirring,

adding dropwise 7 to 50 parts by weight of an organic-solvent solution containing 2 to 5 parts by weight of a hydrogen-abstracting peroxide compound dissolved therein, thereby adding the functional group to an ethylene chain and a main-chain cycloolefin chain of the base polymer to yield a modified cycloolefin copolymer; and

thermally aging the copolymer at 90 to 160°C with stirring for a predetermined time followed by cooling to room temperature to achieve a polymer concentration of 10 to 80 wt%.

5. The process for producing modified cycloolefin copolymers according to claim 4, wherein the functional group is added at a stoichiometric percentage of 20 to 90% of all the replaceable hydrogen atoms in ethylene chains and main-chain cycloolefin chains of the base polymer.

6. The process for producing modified cycloolefin copolymers according to claim 4 or 5, wherein the process achieves a distribution degree of the modified cycloolefin copolymer in the base polymer in the range of 0.01 to 0.1 as expressed in distribution correlation coefficient (DR) defined by the relation (1) below:

$$(DR) = [(RI) - (UV)]^2 \cdots (1)$$

wherein (RI) and (UV) are dispersion indexes of molecular

weight distributions (= weight-average molecular weight/number-average molecular weight) determined by simultaneous detection based on change of refractive index (RI) and detection based on a UV absorption spectrum characteristic of the functional groups added.

7. The process for producing modified cycloolefin copolymers according to any one of claims 4 to 6, wherein the functional group is at least one group selected from the group consisting of carboxyl group, hydroxyl group, amino groups, imide groups, amide groups, epoxy groups, alkoxyalkyl groups, hydroxyalkyl groups and alkoxysilyl groups.

8. The process for producing modified cycloolefin copolymers according to any one of claims 4 to 7, wherein the hydrogen-donating group is vinyl group or (meth)acryloyl group.

9. The process for producing modified cycloolefin copolymers according to any one of claims 4 to 8, wherein the peroxide compound is at least one selected from the group consisting of benzoyl peroxide, lauryl peroxide, di-t-butylperoxyhexahydroterephthalate and dicumyl peroxide.

10. The process for producing modified cycloolefin copolymers according to any one of claims 4 to 9, wherein the peroxide compound is added in an amount such that a ratio of the peroxide compound to a polymerizable unsaturated group in the modifier compound in terms of number of moles of radicals is 0.7-2.5/1.

11. A photoresist resin composition obtained using the modified cycloolefin copolymer of any one of claims 1 to 3.

12. An adhesive resin composition obtained using the modified cycloolefin copolymer of any one of claims 1 to 3 as a main component.

13. A resin for low-moisture permeable films obtained using the modified cycloolefin copolymer of any one of claims 1 to 3.

14. A resin for protective films obtained using the modified cycloolefin copolymer of any one of claims 1 to 3.

15. A resin for overcoating materials obtained using the modified cycloolefin copolymer of any one of claims 1 to 3.

16. A resin for optical members obtained using the modified cycloolefin copolymer of any one of claims 1 to 3.

17. A resin for recording medium substrates obtained using the modified cycloolefin copolymer of any one of claims 1 to 3.

18. A resin for IC package encapsulating materials obtained using the modified cycloolefin copolymer of any one of claims 1 to 3.

19. A resin for light guide plates obtained using the modified cycloolefin copolymer of any one of claims 1 to 3.